

Patent claims

1. A fluid separation device (10) for separating fluid or fluid spray from a gas with at least one plate-like base carrier (21),
at least one fluid separator element (20) arranged in the base carrier (21), wherein the fluid separator element (20) comprises a flow-through tube (22) with a gas inlet (26) and with a gas outlet (27) and in the flow-through tube (22) between the gas inlet (26) and the gas outlet (27) there is arranged a worm-like segment (23) whose thread surfaces with the inner wall of the flow-through tube (22) form a worm-like flow path (25) for the gas, characterised in that
the worm-like segment (23) has a length smaller or equal to 0.5 times the pitch of the worm-like segment (23), and each base carrier (21) with all flow-through tubes (22) and worm-like segments (23), which are arranged in it, is designed as one piece.
2. A fluid separation device according to the preceding claim, characterised in that the at least one base carrier (21) comprises two or more separator elements (20) which are arranged next to one another in the plane of the plate.
3. A fluid separation device (10) according to one of the preceding claims, characterised in that two or more base carriers (21) with in each case the same number and arrangement of separator elements (20), with respect to the plane of the plate are arranged one after the other in a manner such that several separator elements (20) arranged in different base carriers (21) form a common coherent flow path (25) for the gas.
4. A fluid separator device (10) according to the preceding claims, characterised in that the rotational direction in a flow path (25) of worm-like segments (23) arranged serially is in the same direction.
5. A fluid separator (10) according to claim 3, characterised in that the rotational direction in a flow path (25) of worm-like segments (23) arranged serially is in opposite directions.
6. A fluid separation device (10) according to one of the claims 3 to 5, characterised in that the outlet-side edge (30) of the thread surfaces (28) of a first worm-like segment (23a) and the inlet-side edge (29) of the thread surfaces (28) of a worm-like second segment (23b) arranged directly subsequently in the same flow path are arranged twisted with respect to one another, preferably twisted with respect to one another by 0°, 45°, 90° or 135°.

7. A fluid separation device (10) according to one of the claims 3 to 6, characterised in that the two or more base carriers are arranged on one another or connected to one another, with a positive fit.
8. A fluid separation device (10) according to one of the claims 3 to 7, characterised in that the two or more base carriers (21) are glued, screwed and/or locked to one another.
9. A fluid separation device (10) according to one of the claims 3 to 8, characterised in that at least two adjacent base carriers (21) comprise at least one device (16, 17) for fixing the relative position of the two base carriers (21) to one another.
10. A fluid separation device (10) according to the preceding claims, characterised in that as a device (16, 17) for fixing the relative position of the two base carriers (21) to one another, on a first base carrier (21b) at least one bulge (16) and on a second base carrier (21a) the same number of corresponding recesses (17) are provided, which are arranged in a manner such that with an engagement of a bulge (16) into a corresponding recess (17), in each case the flow-through tube (22b) of a separator element (20b, 20a) of the first base carrier (21b) and the flow-through tube (22a) of a separator element (20a) of the second base carrier (21a) are arranged on one another with a positive fit and form a common flow path (25) for the gas.
11. A fluid separation device (10) according to one of the preceding claims, characterised in that they consist of glass and/or plastic and/or metal, or contain these.
12. A fluid separation device (10) according to one of the preceding claims, characterised in that it consists of a duroplast, thermoplast and/or of an elastomer, in particular with a $T_g \geq 80^\circ$, or contain these.
13. A fluid separation device (10) according to one of the preceding claims, characterised in that it consists of polyamide or contains this.
14. A method for manufacturing a fluid separation device (10) according to one of the preceding claims, characterised in that in each case a plate-like base carrier (21) with its at least one separator element (20) is manufactured as one piece.
15. A method according to the preceding claims, characterised in that in each case a plate-like base carrier (21) with its at least one separator element (20) is co-extruded in a die cast method or injection moulding method.

16. The use of a fluid separation device (10) according to one of the claims 1 to 13 as an oil separation device, in particular for separation of oil from blow-by gases, in particular as an arrangement in a valve cover of a combustion engine.
17. The use of a fluid separation device (10) according to one of the claims 1 to 13 as a water separation device, in particular for separating water from electrochemical cells, in particular from the cathode-side and/or anode-side waste gases of a fuel cell.